AP® Environmental Science
2001 Sample Student Responses

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3. In recent years, results from scientific studies have increased public awareness of the possible damage to human health from exposure to indoor air pollution.

(a) Identify two specific indoor air pollutants and, for each, discuss the following.

(i) The type of building most affected by the pollutant

(ii) Source(s) of the pollutant

(iii) The pollutant's effects on human health

(iv) The method(s) of prevention or cleanup of the pollutant

(b) According to the Environmental Protection Agency, at least 17 percent of the four million commercial buildings in the United States can be considered "sick buildings."

(i) Explain what is meant by the term "sick building."

(ii) Describe the criteria used for determining whether a building is "sick."

a) one major indoor air pollutant is cigarrete smoke. cigarrete smoke is found in all buildings and travels ~~in the~~ through the air via vents and air circulation. cigarrete smoke comes from a point-source, cigarretes. second hand smoke damages human lung tissue, ~~of~~ the cilia found in nasal ~~pass~~ and ~~throat throag~~ throat passages, and increases the likelihood of lung related diseases such as bronchitis and emphesyma. it is a nasal and throat irritant, and makes people with chronic lung problems (asthma) more susceptible to other illnesses. cigarrete smoke can also decrease the effectiveness of the human immune system. The only prevention technique for cigarrete smoke is for smokers to stop smoking or stop smoking in buildings. designated "smoke areas" can be set up, where the second hand smoke will not disturb others.

ADDITIONAL PAGE FOR ANSWERING QUESTION 3

another indoor air pollutant is asbestos. asbestos is found mainly in houses and business buildings it is a material found in the walls of buildings, and acts as an excellent insulator. However, it is very dangerous for human health because it flakes off walls and the tiny particles will become lodged ~~in the~~ deeply in human lungs. asbestos can lead to the disease asbestosis. it irritates the lungs and can cause serious damage to lung tissue. new buildings are now not allowed to build with materials made with asbestos. however many old buildings have asbestos in their walls, and air. The only way to check to see if a house contains asbestos is to have a company come and test, which can be rather expensive. once asbestos is identified, it is very expensive to remove.

b) ~~a "sick building" is one where the inhabitants/workers experience many pain~~ many modern buildings are termed "sick buildings" because ~~that~~ many of the building materials contain substances that ~~contribute~~ are unsafe and dangerous to the environment and/or

human health. such things include ~~the~~ materials in air conditioners, vents, and walls. many people that work in "sick buildings" experience dizziness, nausea, headaches, and slowness due to the indoor air pollutants they are breathing in. If many of the individuals in ~~these buil~~ buildings experience these symptoms, the building is termed "sick."

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Asbestos was found in many older buildings as a carcinogen. It was a product used in the insulation that is often placed between walls. Because of the high occurrences of cancer from it, buildings with asbestos must be evacuated and the insulation must be removed. New, uncontaminated insulation should then be put up in the place of the removed pieces. Also, spraying should be done to remove any other traces of asbestos.

Mold is another indoor pollutant. It can be found in any type of building and often elicits an allergic response such as coughing and sneezing. In some cases though, it can cause nausea and vomiting. Mold spores are often released through air vents and may be caused by improper purification after construction. Aside from cleaning the air ducts, little can be done to solve the problem.

ADDITIONAL PAGE FOR ANSWERING QUESTION 3

A "sick building" is one that has a high concentration of certain pollutants, often making work in the building difficult or uncomfortable. Such a determination is made based on the number of people working there who get sick and the amounts of certain pollutants detected. In many cases, though, it is often too late once a building has been classified as sick, and many people have often had an adverse response to the pollutants inside the building before the EPA is able to begin its work to decontaminate the building.

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a) A common indoor air pollutant is the Radon gas which can leak in through cracks or vents in the walls or structuring of the building. Any building is at risk as the gas is produced by septic units and other appliances and can find it's way into a basement or other room. The best way to protect against the Radon gas, which can lead to respiratory problems like bronchitis and emphysema, is to make sure the building is sealed and cracks are filled.

Another dangerous air pollutant is carbon monoxide (CO). This pollutant can be fatal to humans as well as other living household belongings (pets, etc.) and can affect any type of building. CO often comes from automotive emissions which

is why it's so dangerous. Running a vehicle inside of a garage creates a high risk of CO poising and can easily get into the house. A CO detector is recommended to have in every house/building since the gas is undetectable (no smell, sight, taste) to humans and this detector is the best prevention to CO poisoning.

b) A "sick building" is simply defined as a building that is hazardous to a human's health because of air pollutants. The concentration/level of air pollutants in the building can determine exactly how "sick" the building is and the occupants of the building should be aware of this situation. If the building has the ability to affect a person's health because of air pollutants, that building can be determined to be "sick".